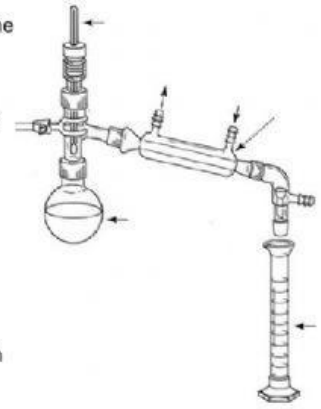
REVISION – SEPARATION METHODS

(complete the texts and add the information to the pictures)

A mixture is composed of ____ or more types of matter that can be present in varying amounts and can be physically separated by using methods that use physical properties to s_____ the components of the mixture, such as evaporation, distillation, filtration and chromatography.

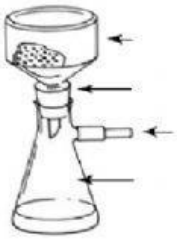
Evaporation can be used as a separation method to separate c_____ of a mixture with a dissolved s____ in a l_____. The liquid evaporates, which means it converts from its liquid state to gaseous state. This often requires heat. Once the liquid is completely evaporated, the solid is all that is left behind.

Distillation is a separation technique used to separate components of a l_____ mixture by a process of h_____ and c_____, which exploits the differences in the volatility of each of the components.



Distillation procedure:
1) the round bottom flask contains the liquid mixture which must be h_____ to a boil,
2) the component with the l_____ boiling point will evaporate first,
3) upon contact with the water-cooled condenser, the g____ will condense,
4) trickle down into the graduated cylinder where the chemist can then recuperate the final distilled l_____,
5) the other l_____ component remains in the round bottom flask (residue)

Filtration is a separation technique used to separate the components of a mixture containing an undissolved s_____ in a l_____. Filtration may be done cold or hot, using gravity or applying vacuum, using a B_____ or Hirsch funnel or a simple glass funnel. The exact method used depends on the purpose of the filtration, whether it is for s_____ of a solid from a mixture or removal of impurities from a mixture.

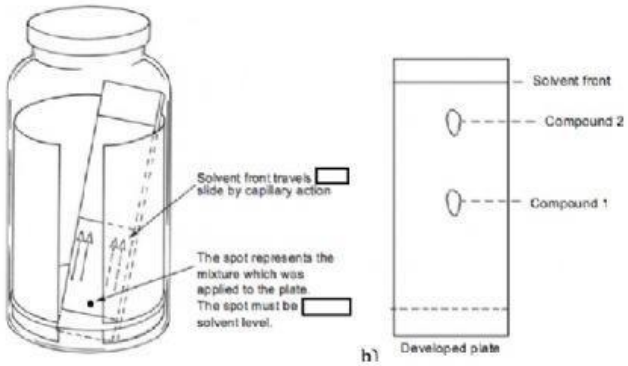


Filtration procedure:
1) the mixture is poured through a funnel lined with a filter paper,
2) the filtrate (liquid) d_____ through to the filter flask,
3) the s_____ remains in the funnel.

Though **chromatography** is a simple technique in principle, it remains the most important method for the separation of mixtures into its components. It is quite versatile for it can be used to separate mixtures of solids, or of liquids, or mixtures of solids and liquids combined, or in the case of gas chromatography, can separate mixtures of g_____. The two elements of chromatography are the s_____ phase and the m_____ phase. (There are many choices of stationary phases, some being alumina, silica, and even paper. The mobile phase, in liquid chromatography, can also vary. It is often either a solvent or a mixture of solvents.)

The mixture is placed on the stationary phase. The mobile phase (=eluant) passes over the mixture and continues to pass through the stationary phase carrying along the components of the mixture. If a component in the mixture has greater affinity for the mobile phase than the stationary phase, it will tend to be carried along easily, if another component in the mixture has a greater affinity for the stationary phase than the mobile phase then it will not be carried along so easily. A separation is thus obtained when the different c_____ in a mixture have different affinity for the stationary and mobile phase.

Three important types of chromatography are:
1) thin l_____ chromatography (TLC)
2) column chromatography
3) g_____ chromatography



Test Yourself

1) Describe different methods of separation – the equipment needed, the procedure and the principle of each.

2) Identify which separation method is most suited for the following mixtures:

Separation methods:	*A mixture of solids*	*A mixture of liquids*	*A mixture of a solid dissolved in a liquid*	A mixture of solid and liquid
Evaporation				
Distillation				
Filtration				
Chromatography				

3) What method of separation would be most effective on the following mixtures:

a) Sea water

b) Gold nuggets in water.

c) A solution of alcohol (liquid) and water.